SYNOPSIS FOR Ph.D. REGISTRATION IN GEOGRAPHY

(FACULTY OF SOCIAL SCIENCE)

Title of Research:

Impact Of Urbanization On The Environmental Pollution Of Ranchi City: Using Geo-Spatial Techniques

Submitted

For The Ph.D. Registration in Geography

Under The Supervision Of

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1. A brief introduction of the research topic

Urbanization is a structure of social transformation from conventional rural communities to modern urban societies. Urbanization can be defined as "as a process which reveals itself through temporal, spatial and sectoral changes in the demographic, social, economic, technological, and environmental aspects of life in each society." (Tripathi, 2016 b). Urbanization is not only accompanying to industrialization but it is also interlinked with modernization and these three sometimes work in conjunction. The process of urbanization in developed countries has been very slow but steady and it has been accompanied by agricultural and industrial revolution, higher per capita income, and high standard of living, whereas in developing countries the rate of urbanization is very fast and it is not accompanied by industrialization but rapid growth of service sector in the economies.

Ranchi city got its first municipality in 1869, which covered an area of 7.02 sq. km. This was extended in 1951 and 1971 to 20.3 sq. km and 89.98 sq. km respectively. The present RMC was established in 1979 covers an area of 175.12 sq. km, and now there is a rapid vertical expansion also. Ranchi, the Infrastructure has resulted in extensive urbanization, which has spilled to its hinterland and the surrounding countryside. The creation of Jharkhand state on 15th November 2000, gave Ranchi the privilege of becoming the capital of the state. As a result of which the Population density of the district of Ranchi changed drastically, and all-round development started to take place. Ranchi municipal corporation will be the unit of study area in which the main focus will on the degradation of environment due to urbanization. The Study area lies roughly between 23º 15' N to 23º 25' N latitudes and 85º 15'E to 85º 25' E longitudes. It falls under survey of India toposheet No. 73 E/7 .

2. State of the arts

Urbanization is an intricate phenomenon that denotes the physical growth of urban area. the process of urbanization leads to the development of towns and cities, a high density of population, population growth, expansion of built-up area vertical as well as horizontal and subsequently psychological transformation of behaviors.

In India, a similar pattern of urbanization has emerged. Impoverished rural migrants have moved to cities in search of employment. The consequent lack of housing has produced slums, while the factories that employ them have polluted their surrounding environments

(Susan E. Chaplin). Urbanization rate in India is much lesser than other developed countries. The state wise variations in India are significant. In case of interstate analysis, it is shown that Maharashtra is the highest urbanized state while Assam is the least once. It isestimated that there are almost billion poor people in the world. Of this over 750million live in urban areas without adequate shelter and basic services. Due to urbanization, there is problem of employment, environmental pollution, congestion, transportation etc. There is also regional disparity between different groups within that limited urban area. Slum formation is a major problem now a days in urban areas. The basic services are not available according to the requirement. Cities are suffering from urban poverty, employment, shortage of housing; crisis in urban infrastructural services: these large citiescannot absorb these distressed rural migrants i.e., poor landless illiterate and unskilled agricultural laborers. Hence this migration to urban class causes urban crisis more acute.

Urbanization in Ranchi refers to the rapid growth of the city as a result of increasing population, migration from rural areas, and economic development. Ranchi is the capital city of Jharkhand state in India, and it has experienced significant urbanization in recent years. According to the Census of India 2011, the population of Ranchi was 1.12 million, and it is estimated to have increased to 1.5 million in 2021. The urbanization in Ranchi has been driven by several factors, including the growth of the service sector, the expansion of transportation, infrastructure, and the development of industrial clusters. Ranchi is home to several major industries, including heavy engineering, automobiles and mining, which have attracted a large number of migrants from rural areas in search of employment opportunities. This has led to the rapid growth of informal settlements and slums in and around the city, which have put pressure on the urban infrastructure and services. Overall, urbanization in Ranchi is a complex process that presents both opportunities and challenges for sustainable development. It is important to understand the environmental and social impacts of urbanization and develop strategies for promoting sustainable urban development that addresses the needs of all residents, including the poor and marginalized communities.

P, Pandey (1970) in his book on “Impact of industrialization on urban growth” has mentioned the rich endowment, large industrial establishments were almost non-existence in the region till as late as 1907. The first world war was a turning point in industrialization and urban growth in the region.

Srivastava Bimla (1997) in her thesis “Pattern and problem of land use in Ranchi city and its environs” has mentioned the percentage of use of land has increased on one hand, resulting in the expansion of the city and on the other hand the nature of land use has been transformed into other alternative uses.

Ramachandran, (1992) in his book on "Urbanization and Urban System in India". Ramachandran described the Indian statistics and application of urban geographical principles to India's history of urban development. Secondly, the author has something of a mission calling for studies which address current urban problems in India, including proliferation of slums, the inadequacy of city transport, inflated land values, deficiencies in infrastructure and the unequal spatial distribution of urban services.

Amitabh Kundu, (1994) published an article on "Pattern of Urbanization with special reference to Small and Medium Towns in India". According to him, urban growth across the size categories presents some interesting features. Till the nineties Class I cities in developed states grew at a faster rate as compared to small and medium towns.

Banerjee falguni (2003) in her thesis “Environmental pollution in Delhi” Has mentioned about that there are thousands of jhuggis –jhoppris and unauthorized Colonies where people from various parts of India live in substandard condition. their numbers have been increasing at a tremendous speed. People living in these jhuggis do not have the basic amenities of life.

Prasad, Jiwadhan (2004) in his thesis “Problem of land misuse in Ranchi city “Has explained about the lack of uniformity in land use and rapidly changing use of land, pose limitation in evaluating the proportion of land which has been misused.

Khatoon Farida (2007) in her thesis “Problem of urban water supply and its management: A case study of Ranchi city.” Has mentioned that for a city like Ranchi which is a plateau, garbage dumping can be done on rocky places so that they don’t pollute sub-surface water during rains by percolation.

Singh Pradip Kumar (2018) in his book "Urban Sprawl of Ranchi city" Has mentioned Ranchi city has rapid growth of urbanization has facing numerous challenges regarding its extension of area around the city and urban civic amenities. thus, the challenges are exiting from become a capital of Jharkhand. Due to rapid urbanization and formation of newly state capital the physical growth of Ranchi city is tremendously changed in different time period.

Minz Madhumita(2020)in her thesis "Function of urban fringe of Ranchi city "Has mentioned that the urban fringe evolution is the result of the operation of different historical, demographic and functional factors. The urban fringe is the result of economic activity and growth impulses from the city centre.

Das Rajeshree (2022) in her thesis "Urbanization and its temporal pressure on land resource "Has mentioned that rapid urbanization with the substantial increase in built-up area has caused severe losses of land resource under agriculture, forest and water bodies. While such expansion is attributed to increasing urban population with enormous rise in non-agriculture activities, that's also effect climate of Ranchi city.

3. Problem to be investigated

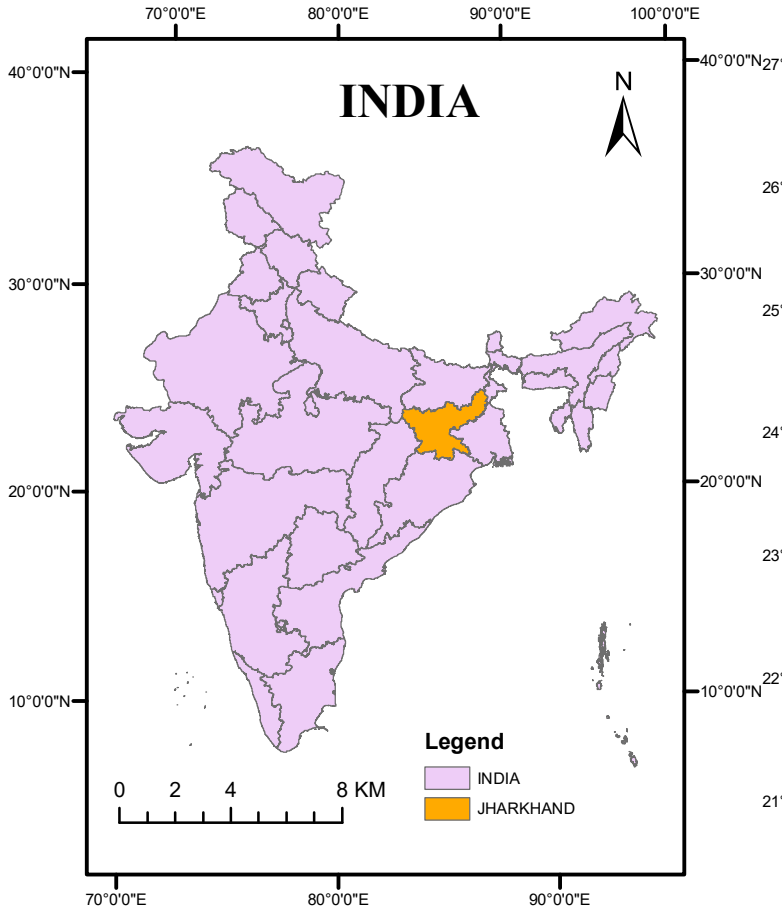
The problem to be investigated related to the impact of urbanization on the environment of Ranchi city is the environmental degradation caused by rapid urbanization. The city has experienced significant growth and development in recent decades, which has resulted in various environmental problems such as air, water pollution and waste management issues. The increase in population, urban sprawl is some of the key drivers of environmental degradation in Ranchi. Additionally, the existing environmental policies and regulations may not be effective in addressing these challenges.

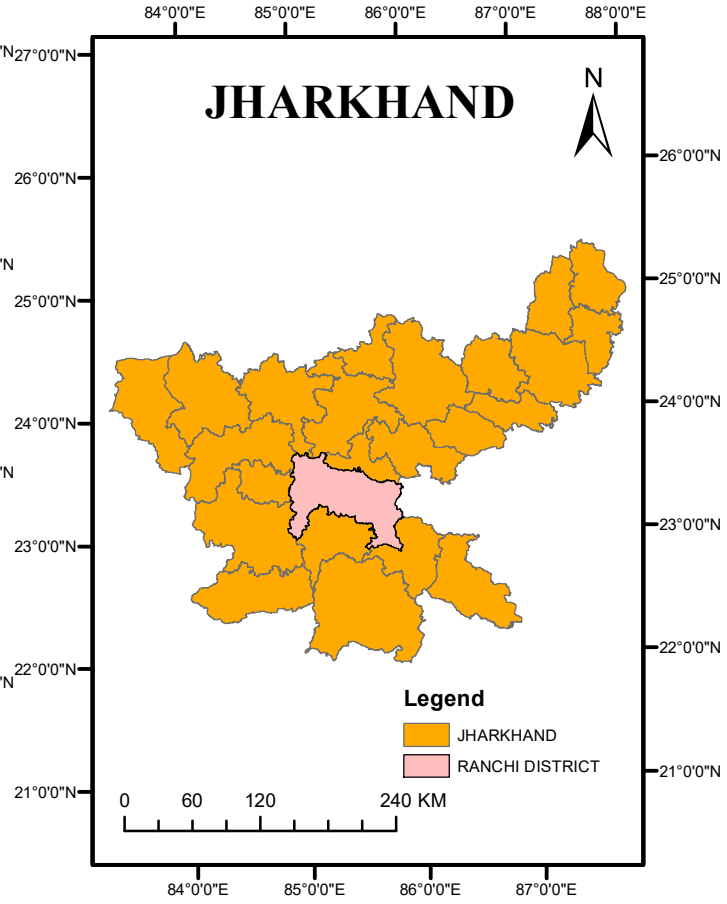
The specific problems to be investigated in the impact of urbanization on the environment of Ranchi city may include:

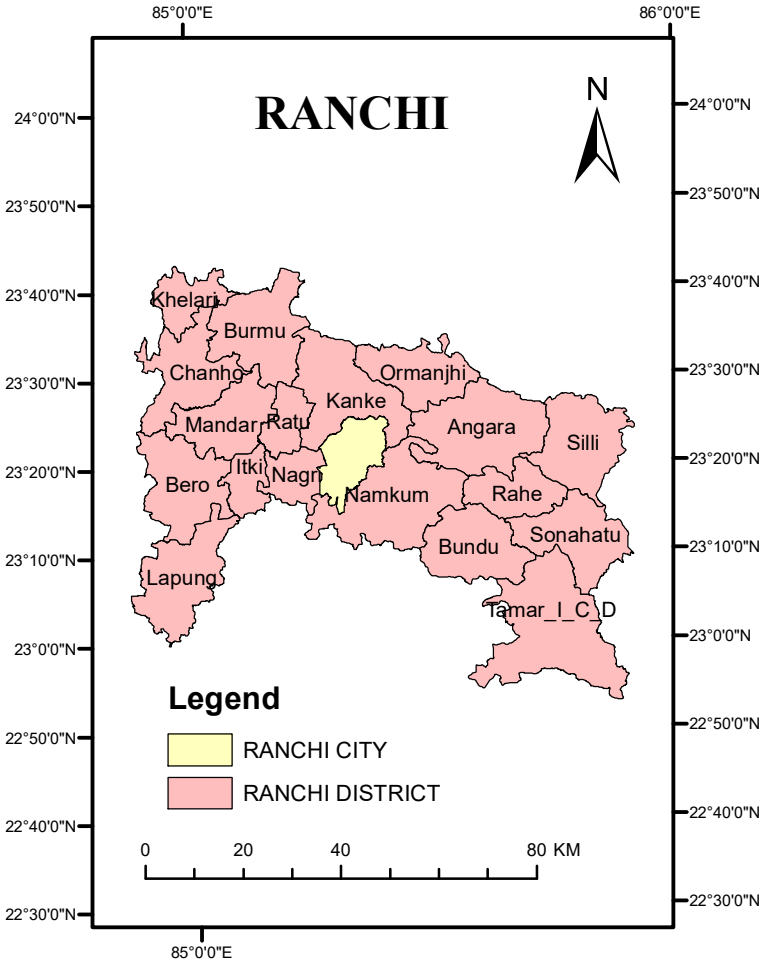
1. Population of the Ranchi city has been increasing very rapidly due to its position as administrative town after the formation of Jharkhand state.

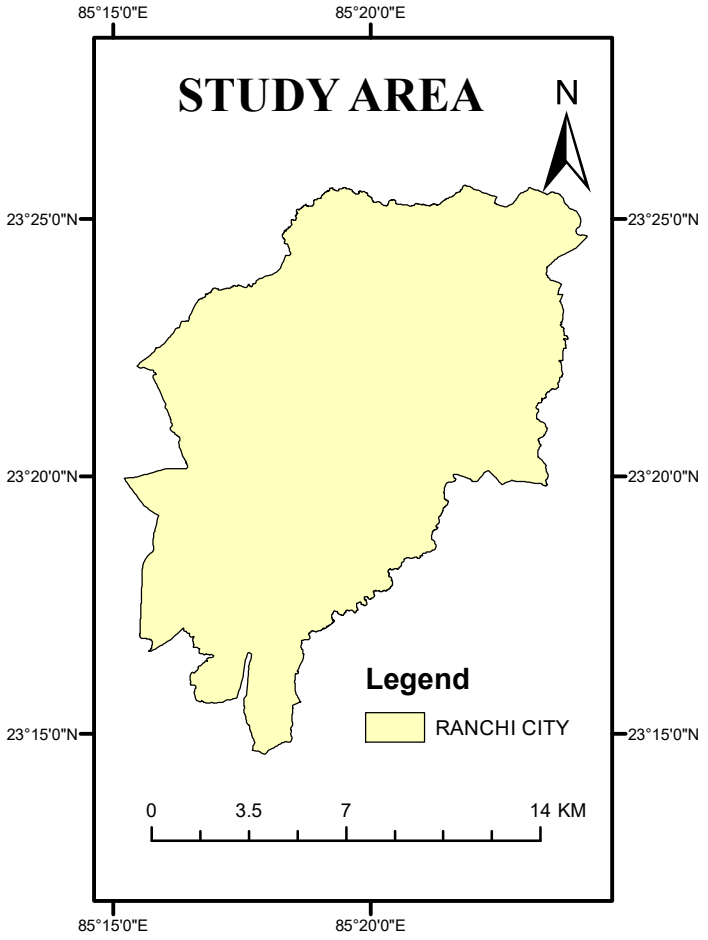
2. There is a rapid increase in urbanization. It shows a positive impact on development whereas it leaves several negative marks on the environment.

LOCATION MAP OF THE STUDY AREA









3. Environmental problems i.e., change in air quality and water quality due to urban expansion.

4. Solid waste management issues due to increasing urbanization and inadequate waste disposal facilities.

4. Objective of the investigation and motivation

The objective of investigating the impact of urbanization on the environment of Ranchi city is to understand the extent of the problem and identify strategies for mitigating its negative impacts. Specifically, the investigation aims to achieve the following objectives:

1. To evaluate the impact of urbanization on air quality of Ranchi city.
2. To examine the change in water quality within city due to urbanization.
3. To evaluate the solid waste management issues due to increasing urbanization.
4. To study the impact of urbanization on noise pollution levels in different zones.
5. To analyze the Spatio-temporal change in land use land cover and its impact on environment of Ranchi city.

The motivation for investigating the impact of urbanization on the environment of Ranchi city is to uniform policies and practices that promote sustainable development and protect the environment in the city. The rapid pace of urbanization in Ranchi has led to significant environmental problems, which have negative impacts on public health, quality of life, and economic development. By understanding the drivers and impacts of these environmental problems, and identifying strategies for addressing them, policymakers and stakeholders can take uniformed decisions that promote sustainable urban development and protect the environment in Ranchi city.

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5. Research Hypothesis

In order to study the Impact of urbanization on the environment of Ranchi city,the following hypothesis has been considered.

1. The level of pollution in Ranchi city is significantly higher in areas with high traffic volume and industrial activity compared to areas with low traffic volume and industrial activity.
2. Rapid population growth leads to changes in land use pattern of the city.
3. The discharge of untreated sewage and industrial waste into the water bodies in Ranchi city is a significant contributor to water pollution.
4. The current waste management practices in Ranchi city are insufficient, leading to inadequate collection and disposal of solid waste.

6. Research design and methodology

A research design is the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure. In fact, research design is the conceptual structure within which research is conducted; it constitutes the blueprint of the collection, measurement and analysis of data. In a nutshell research design answers what, why and where the data in the research work will be taken into consideration.

So far as the sample size of the present work is concerned, the study will be based on purposive sampling method and stratified random sampling. Which will cover various wards of Ranchi municipal area where the rapid urbanization has been observed. Approximately 200 samples will be collected from the various ward of Ranchi Municipal Corporation. Data will be collected on different variables like population growth, land use land cover ,water and air quality , solid waste and noise level in different zones.

It will also be based on both laboratory and intensive field observation which will include different kind of statistical illustration and cartographic techniques. Most of the charts, tables and maps will be original contribution of the researcher.

Tentative Chapterisation

The above research work will have the following tentative chapters.

INTRODUCTION

CHAPTER I: Geographical background.

CHAPTER II: Causes and type of Environmental pollution.

CHAPTER III: Urban Morphology of Ranchi city.

CHAPTER IV: Impact of urbanization on Environmental pollution of Ranchi City.

CHAPTER V: Issues regarding urbanization and environmental pollution.

CHAPTER VI: Planning and Management

CHAPTER VII: Protective Measures to control environmental pollution.

CONCLUSION

REFERENCS

APPENDIX

7. Sources of data and tools to be used in collection of data

This study will be based on both primary and secondary data. The primary data will be collected in a micro study by means of a purposive sample survey, participant-observation, interview, and in-depth case study methods. Other sources like land record, topographical maps of survey of India, village revenue record, Block office record and records of municipal body, gazetteers, town and country planning, Department of Ranchi development authority and master plan of the cities etc. The secondary data sources principally include the various Land sat satellite datasets and other published material from government sources and other institutions.

8. Analysis of data

This research aims to analyze the effects of urbanization on environment sustainability in Ranchi. Remote Sensing and GIS has been used as an important tool in the present study. Remote sensing provides the real time spatial data of the study area and also the multi- temporal change detection analysis. GIS can be used in linking data to maps, in combining different data layers in overlays, in spatial analysis and for output presentation.

9. Significance of the study

The proposed research can help to identify the specific environmental problems associated with rapid urbanization in Ranchi City, such as air and water pollution, waste management, and climate change. This can help policymakers and urban planners to focus on the most pressing issues and develop targeted interventions to address them. The research can inform policy and planning decisions related to sustainable urban development in Ranchi City. It can provide evidence-based recommendations for improving policy and institutional frameworks for promoting sustainable urban development, such as clean technologies, green infrastructure, and participatory governance approaches. The research can identify best practices and lessons learned from other cities that have undergone similar urbanization processes, which can be applied in Ranchi City. This can help to avoid repeating the mistakes made by other cities and adopt successful practices that have worked elsewhere. The study can help to protect the environment and public health in Ranchi City. It can provide evidence- based recommendations for reducing environmental pollution, conserving natural resources,and mitigating climate change impacts, which can improve the quality of life for residents

and reduce the burden of environmental diseases.

10. Its relevance to the present-day problem and need of the society.

The study of the impact of urbanization on the environment of Ranchi City is significant for promoting sustainable urban development, protecting the environment, and improving public health and well-being.

11. Contribution to the existing knowledge

Contribute to the existing knowledge on the impact of urbanization on the environment of Ranchi City by providing empirical evidence, identifying drivers of environmental problems, evaluating policies and practices, identifying strategies for promoting sustainable urban development, and serving as a case study for other cities undergoing similar urbanization processes.

12. Future work

The findings and recommendations of the study can inform policy and planning decisions, guide future research, and contribute to achieving the SDGs related tosustainable cities and communities, climate action, and life on land. This research aims to contribute to the understanding of urbanization dynamics in Ranchi and its implications for socio-economic development and environmental sustainability. The findings can inform policy decisions and urban planning strategies to ensure a balanced and sustainable urban growth model in Ranchi, enhancing the quality of life for its residents while minimizing environmental degradation.

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